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Custom Display

Mechanical design



Project No. 项目编号	ET043WV12-T
Customer 客户名称	
Module No. 客户型号	
Product type 产品内容	Standard LCD Module TFT: 800*RGBx480Dots 4.3" TFT LCD

客户确认Customer Approval

项目负责人Project Manager	
品质主管Director of Quality	
采购工程师Purchasing Engineer	

PREPARED BY	CHECKED BY	APPROVED BY



1. Introduction

1.1 Scope of application

This specification applies to the LCD module that is supplied by YOURITECH TECHNOLOGY

LCD specification: Dots 800xRGBx480

As to basic specification of the driver IC, refer to the IC (ST72568) specification and data book.

All material & processing of the LCD module should be Lead Free.

1.2 TFT features:

Structure: TFT PANNEL+IC +FPC+BL;

ALL O'CLOCK Type LCD

800dot-segment and 480dot-common outputs;

16.7M Color can be selected by software;

White LED back light;

24bit RGB Interface



2. LCM General specification

ITEM	Standard value	Unit
LCD Type	Normally Black	--
Drive element	TFT active matrix	--
Number of pixels	800*3RGB(H)X480(V)	Dots
Pixel arrangement	RGB Vertical Stripe	--
Pixel Pitch (W*H)	0.1188 (H) x 0.1122 (V)	mm
Active area	95.04(W) x 53.86(H)	mm
Viewing direction	ALL O'CLOCK	--
TFT Driver IC	ST72568	--
TFT interface	24bit RGB Interface	--
LCM Size(W*H*T)	105.50(W) ×67.15(H) ×2.86(T)	mm
Approx. Weight	TBD	g
Touch structure	--	--
Touch Driver IC	--	--
Touch Interface	--	--





3.Absolute Maximum Rating

Characteristics	Symbol	Min.	Max.	Unit
LCM Operating Temperature	T _{OPR}	-30	+85	°C
LCM Storage Temperature	T _{STG}	-30	+85	°C
Humidity	RH	--	90	%

4.Electrical Characteristics

4.1 TFT DC Characteristics

Characteristics	Symbol	Min.	Typ.	Max.	Unit
Supply Voltage for(DC/DC)	VDD	3.0	3.3	3.3	V

4.2 Back-Light Unit Characeristics

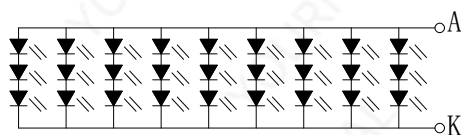
The back-light system is an edge-lighting type with 27 white LEDs. The characteristics of the back-light are shown in the following tables.

Characteristics	Symbol	Min.	Type	Max.	Unit	Notes
Forward Voltage	V _F	8.4	--	9.6	V	--
Forward current	I _F	--	180	--	mA	--
Luminance(With LCD)	L _v	--	1000	--	cd/m ²	--
LED life time	N/A	--	30,000	--	Hr	Note 1

Note:

- (1) The “LED life time” is defined as the module brightness decrease to 50% of original brightness at I_L=20mA/LED. The LED life time could be decreased if operating I_L is larger than 25mA/LED.

Backlight circuit diagram shown in below:



5. Module Function Description

Pin No	Symbol	Description	Notes
1	LEDK	Power supply for backlight cathode input terminal.	



2	LEDA	Power Supply For LED Backlight Anode Input.	
3	GND	Ground	
4	VDD3.3V	Power Supply For LCD.	
5	R0	Red data	
6	R1	Red data	
7	R2	Red data	
8	R3	Red data	
9	R4	Red data	
10	R5	Red data	
11	R6	Red data	
12	R7	Red data	
13	G0	Green data	
14	G1	Green data	
15	G2	Green data	
16	G3	Green data	
17	G4	Green data	
18	G5	Green data	
19	G6	Green data	
20	G7	Green data	
21	B0	Blue data	
22	B1	Blue data	
23	B2	Blue data	
24	B3	Blue data	
25	B4	Blue data	
26	B5	Blue data	
27	B6	Blue data	
28	B7	Blue data	
29	GND	Ground	
30	DCLK	Dot clock signal for RGB interface operation.	
31	DISP	Standby mode, Normally pulled high. STBYB = "1", Normal operation STBYB = "0", Enter standby mode for power saving.	
32	HSYNC	Horizontal (Line) synchronizing input signal for RGB interface operation.	
33	VSYNC	Vertical (Frame) synchronizing input signal for RGB interface operation.	
34	DE	Data enable signal for RGB interface operation.	
35	NC	No Connection.	
36	GND	Ground	
37	XR	Touch panel coordinate in the Right	
38	YD	Touch panel coordinate in the Down	
39	XL	Touch panel coordinate in the Left	

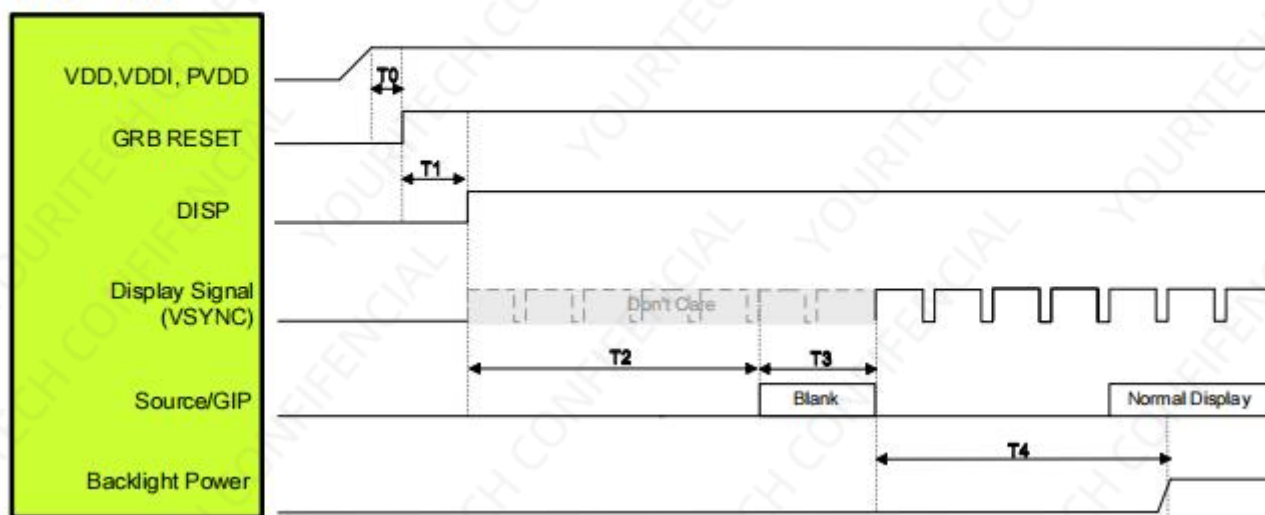


40	YU	Touch panel coordinate in the Up	
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6. Timing Characteristics

Power On Sequence

Power Mode



Symbol	Description	Time	Unit
T0	System power stability to GRB RESET signal	≥1	ms
T1	GRB RESET= "High" to DISP="High"	≥10	ms
T2	DISP="High" to Source/GIP scan blank	85	ms
T3	IC scan blanking signal	≥33	ms
T4	Display signal input to Backlight power on (base on Display Signal Frame Rate 60Hz)	≥100	ms

Note: 1. When DISP pull "H" or "L", IC will execute the internal power on or power off procedures. Please be careful about the timing of DISP and do not interrupt it during power on or power off procedure, otherwise unexpected errors will occur.

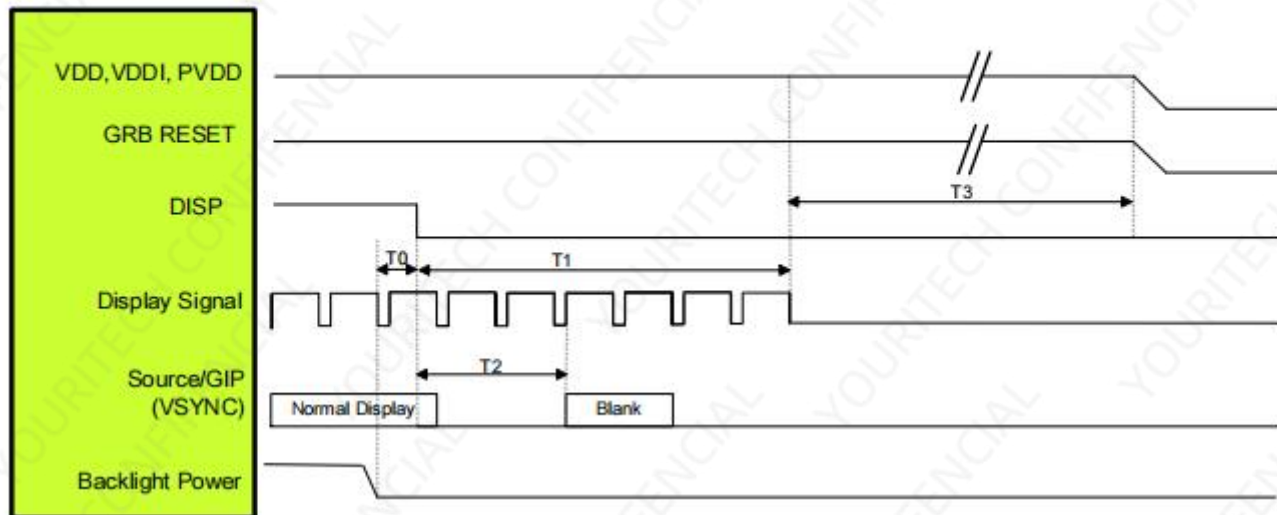
2. RGB interface Display signal: DCLK; VSYNC; HSYNC; DE; DR[7:0]; DG[7:0]; DB[7:0].

3. LVDS interface Display signal: DCLK P/N; RX[3:0] P/N



Power Off Sequence

Power Mode



Symbol	Description	Time	Unit
T0	Backlight Power off to DISP="Low"	≥1	ms
T1	DISP="Low" to IC internal voltage discharge complete	≥100	ms
T2	DISP="Low" to Source/GIP scan blank (base on Display Signal Frame Rate 60Hz)	≤50	ms
T3	IC internal voltage discharge is completed to VDD/VDDI/PVDD off	≥0	ms

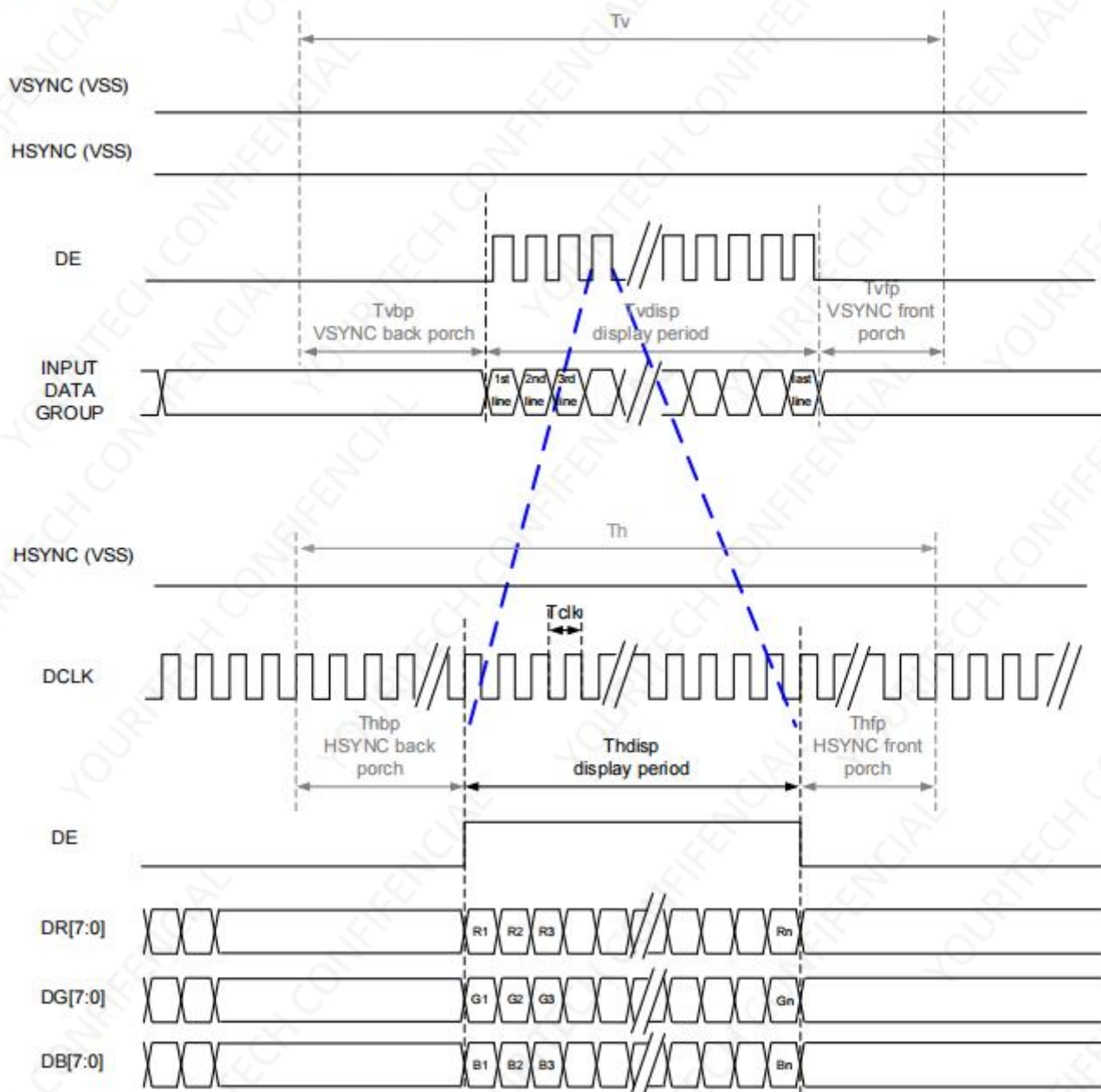
Note: 1. When DISP pull "H" or "L", IC will execute the internal power on or power off procedures. Please be careful about the timing of DISP and do not interrupt it during power on or power off procedure, otherwise unexpected errors will occur.

2. RGB interface Display signal: DCLK; VSYNC; HSYNC; DE; DR[7:0]; DG[7:0]; DB[7:0].

3. LVDS interface Display signal: DCLK P/N; RX[3:0] P/N.



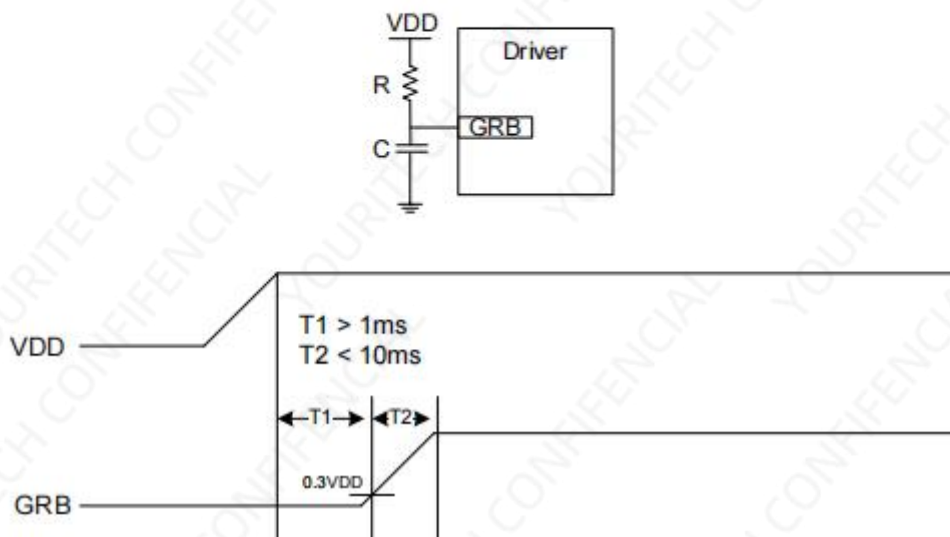
DE Mode



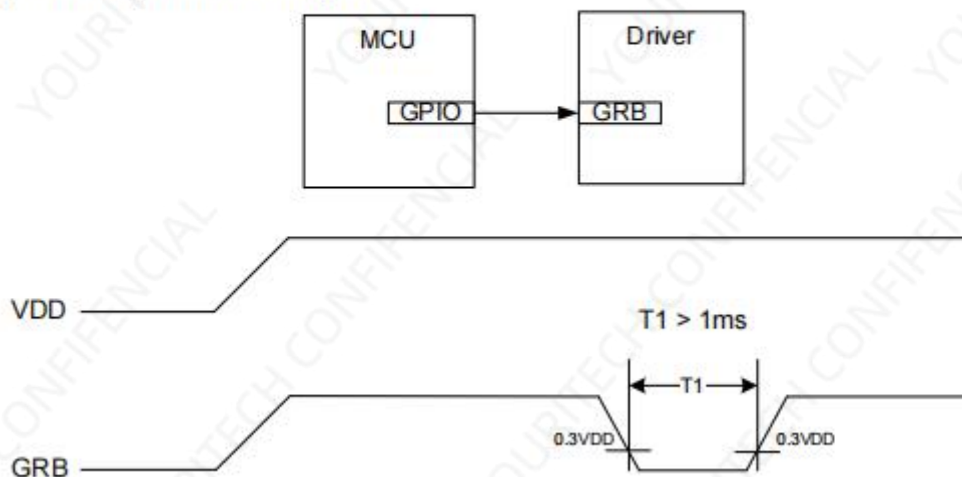
Reset timing

Setting GRB pin to "L" (hardware reset) can initialize internal function. Initialized by GRB pin is essential before operating. There are two suggestions for hardware reset connection.

(1) The GRB pin with external RC circuit.



(2) The GRB pin controlled by MCU.



7.Optical Characteristics

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing Angle range	Horizontal	Θ_3	CR > 10	-	80	-	Deg.	Note 1
		Θ_9		-	80	-	Deg.	
	Vertical	Θ_{12}		-	80	-	Deg.	
		Θ_6		-	80	-	Deg.	
Luminance Contrast ratio		CR	$\Theta = 0^\circ$	-	1200	-		Note 2
Color Gamut	NTSC	CIE1931	$\Theta = 0^\circ$	-	50	-	%	Note 5 @C Light
Reproduction of color	White	Wx	$\Theta = 0^\circ$	Typ -0.03	0.311	Typ +0.03		
		Wy			0.338			
Response Time		Tr+Td	Ta= 25° C $\Theta = 0^\circ$	-	30	-	ms	Note 6

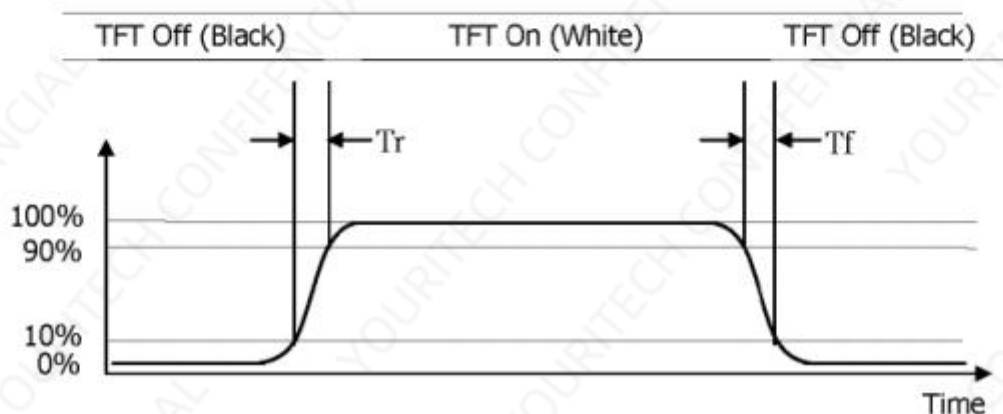


Note :

1. Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing are determined for the horizontal or 3, 9 o'clock direction and the vertical or 6, 12 o'clock direction with respect to the optical axis which is normal to the LCD surface.
2. Contrast measurements shall be made at viewing angle of $\theta = 0^\circ$ and at the center of the LCD surface. Luminance shall be measured with all pixels in the view field set first to white, then to the dark (black) state. (See FIGURE 1 shown in Appendix)
Luminance Contrast Ratio (CR) is defined mathematically.

$$CR = \frac{\text{Luminance when displaying a white raster}}{\text{Luminance when displaying a black raster}}$$

3. Center Luminance of white is defined as the LCD surface. Luminance shall be measured with all pixels in the view field set first to white. This measurement shall be taken at the locations shown in FIGURE 4 for a total of the measurements per display.
4. The White luminance uniformity on LCD surface is then expressed as : $\Delta Y = \frac{\text{Minimum Luminance of 9 Points or 5 points}}{\text{Maximum Luminance of 9 Points or 5 points}}$ (See FIGURE 2).
5. The color chromaticity coordinates specified in Table 5. shall be calculated from the spectral data measured with C light. Measurements shall be made at the center of the panel.
6. The electro-optical response time measurements shall be made as FIGURE 5 shown in Appendix by switching the "data" input signal ON and OFF. The times needed for the luminance to change from 10% to 90% is T_d , and 90% to 10% is T_r .



8. Reliability Test Item

No.	Test Item	Test Condition	Notes
1	High Temp. Storage	+85°C / 96H	1. Functional test is OK. Missing Segment, short, unclear segment non-display, display abnormally and liquid crystal leakage un-allowed. 2. No low temperature bubbles, end seal loose and fall, frame rainbow.
2	Low Temp. Storage	-30°C / 96H	
3	High Temp. Operating	+85°C / 96H	
4	Low Temp. Operating	-30°C / 96H	
5	High Temperature / Humidity storage	60°C x 90%RH / 96H	
6	Thermal and cold shock	Static state, -30°C (30min) ~85°C (30min), 10 cycles	

